

The Growth of Rocky Planets

John Chambers

(Email: chambers@dtm.ciw.edu)

Department of Terrestrial Magnetism, Carnegie Institution of Washington, Washington, D.C.

With the discovery of more than a hundred giant planets orbiting Sun-like stars, it is natural to ask what fraction of stars will possess rocky, Earth-like planets, a fraction commonly referred to as η_{Earth} . In this talk, I will describe how we can place plausible constraints on the value of η_{Earth} using current theoretical models for the formation of Earth-like planets in the Solar System, together with relevant astronomical observations and cosmochemical data. Following convention, I will divide the process of planet formation into a series of stages, beginning with the formation of a protoplanetary nebula and ending with the long-term stability of planetary orbits. At each stage, I will discuss the conditions needed to proceed to later stages of planetary growth, and indicate possible bottlenecks along the way. While we have good working models for some stages of planetary growth, other stages are poorly understood at present, leading to large uncertainties in η_{Earth} . I will briefly discuss how these uncertainties may be reduced in the years leading up to the TPF/Darwin mission.

